

also refer to a fact which they have themselves ascertained—namely, that whenever the secretion of bile is suppressed, or even diminished, the quantity of cholesterine in the blood increases.]

**EIGHTH LAW.**—*The albumen of the serum of the blood diminishes considerably under these circumstances; Bright's disease—certain diseases of the heart, accompanied with dropsy, and grave puerperal fever.*

The developments of this proposition are reserved until the diseases here mentioned are considered. The number of facts examined are too few to warrant as yet the positive enunciation of this law, which, however, we believe to be true.

MM. Becquerel and Rodier next consider at great length the composition of the blood in various diseases, and compare their results with those obtained by other observers, especially by MM. Andral and Gavaret, and conclude by the following summary of their researches. The numerous and important results contained in this memoir are of three kinds; some are simply confirmations of the discoveries of our predecessors; others invalidate, in part at least, results hitherto generally admitted; others, again, are entirely new. Those three classes of results may be thus summed up:—

a. We have confirmed the following results.

1. Increase of fibrin in the phlegmasiæ, as established by MM. Andral and Gavaret.
2. Diminution of the globules in chlorosis, in anæmia, and under the influence of protracted abstinence—a fact ascertained by M. Lecanu, and confirmed by MM. Andral and Gavaret.
3. Diminution of the globules after hemorrhage, as first indicated by MM. Dumas and Prevost, and confirmed by MM. Andral and Gavaret.
4. The trifling influence of venesection on the fibrin.
5. The diminution of albumen in Bright's disease, pointed out by Gregory, Bostock, Christison, Andral and Gavaret.

b. Results which our experiments seem to invalidate.

1. The number 127-1000, stated to represent the general mean of the globules during health, is too low, and the mean is not the same in the two sexes.
2. The number 3-1000, supposed to represent the fibrin, is too high.
3. The supposed augmentation of the globules in plethora, affirmed by M. Lecanu, and admitted by MM. Andral and Gavaret, is erroneous.
4. The supposed, almost constant, diminution of the proportion of fibrin in bad fevers, is also a mistake.

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11. *Composition of the Urine.*—In a highly interesting paper on the constitution of the urine, Liebig\* maintains the following points:

A. That neither lactic acid nor any lactate exists in healthy urine; the evidence being, 1, that hitherto no example is known of lactic acid being produced by the decomposition of a nitrogenous substance; 2, that the urine of the herbivora, in which lactic acid or its salts might be expected, (if they existed in that of the carnivora,) does not contain either; 3, that lactic acid has never yet been clearly detected in the urine of men or carnivora; 4, that the carnivora take no food from which lactic acid could, by transformation, be produced; 5, that fresh urine will not dissolve the smallest quantity of barytes, though lactate of barytes is easily soluble in water; 6, that in various and the most careful experiments, it has been impossible to detect even a trace of lactic acid in large quantities of putrid urine, in which, if it had existed when fresh, it could not have been altered by putrefaction, and if it had not existed when fresh, it might, perhaps, have been produced by putrefaction. An organic acid was produced in putrefaction, but it was acetic acid combined with a resinous highly azotised substance.

B. Hippuric acid is a constant constituent of healthy human urine; for 1, benzoic acid is obtained (as Proust observed), with acetic acid, by distilling urine with sulphuric or hydrochloric acid; but, 2, this benzoic acid cannot exist as such in the fresh urine; for benzoic acid is converted in the organism into hippuric acid; and the hippuric acid known to exist in the urine of herbivora yields benzoic acid when it is decomposed; and 3, the existence of hippuric acid may be clearly

\* Ann. der Chemie und Pharm., Mai; and Lancet, June 1-8, 1844.

proved in even small quantities of fresh urine, by evaporating it to the consistence of syrup, mixing with it some hydrochloric acid, and agitating it with ether, which dissolves the hippuric acid.\*

The hippuric acid thus obtained, cannot be derived from the decomposition of benzoic acid taken in the food, (for probably none of man's food contains any;) it is formed in the body from the non-nitrogenized aliments. The acetic acid does not exist in fresh urine; but it and the resinous substance with which it is combined may be regarded as the products of the decomposition of the colouring matter of the urine.

c. The acid reaction of healthy urine is due to the presence of the acid phosphate of soda, and the mode in which this salt is produced is as follows: alkaline phosphates are taken in meat, flour, and grains; none of these contain any free alkali; and it is from these phosphates and not from any free alkali or alkaline carbonate, that the chyle, lymph, and blood, derive their alkaline reaction. Now, among the remarkable properties of the bibasic phosphates of soda and potass are their relations to uric and hippuric acids. Both these acids dissolve very easily in water, to which common phosphate of soda has been added, and with their solution, the phosphate loses its alkaline, and assumes an acid reaction. And thus, when the uric and hippuric acids are formed in the organism, they combine with the soda of the alkaline phosphate, forming the highly soluble urate and hippurate of soda, and an acid phosphate of soda.

d. But besides this, there is another cause by which the acidity of the urine is maintained and increased. The urine of man and the carnivora contains a large quantity of sulphates; but their food does not contain either those salts ready-formed, or any oxygen-compound of sulphur. The sulphur which it does contain, or (which comes to the same thing), the sulphur of the transformed tissues, must therefore combine with oxygen in the body, and the sulphuric acid thus formed, combining with part of the alkali of the alkaline phosphates, converts them into acid phosphates, and thus maintains and increases the acidity of the urine.

e. It follows that whether the urine will be acid or not, depends upon the nature and quantity of the *bases* taken with the food. If the amount be sufficiently large to neutralize the uric, hippuric, and sulphuric acids formed by the organism, and the acids supplied by the food, the urine must be neutral; if the amount be more than enough, the urine must be alkaline; if less, acid. And hence, no physiological or pathological inference can be drawn from our examination of the urine, unless an account be taken of the inorganic acids, salts, and bases taken with the food.

An exception to the rule that carnivora alone produce uric acid exists in the case of butterflies, (and other lepidoptera?) Heller has discovered that in proportion to the weight of their bodies, they of all animals produce the greatest quantity of uric acid. Their urine is analogous to that of serpents and predatory birds, containing as a chief constituent urate of ammonia; it is principally a product of the metamorphoses which go on in the pupa state, and the red or yellow fluid which they discharge soon after being hatched is chiefly urate of ammonia. The secretion continues in after life.†—PAGER's Report in *B. & F. Med. Review*, April, 1845.

12. *Use of Gelatin in food.*—The Amsterdam commission for determining the nutritive properties of gelatin as obtained from bones by steam, and used in large quantities in "economic soup" in Dutch public institutions, have confirmed the conclusion of the commission of the Paris Institute, that it has had hardly any nutritive properties when taken alone; and, in regard to the important point left unsettled by the French commission, namely, whether, when added to other kinds of food, gelatin contributes to the total amount of nutriment, they have also come to a negative conclusion. None of the three dogs to whom considerable quantities of it

\* Liebig estimates the quantity of benzoic acid in the urine to be equal to that of the uric acid. Dr. Golding Bird has never found it exceed one-third of the quantity of the latter. (*Med. Gazette*, Aug., 23, 1844.)

† Oesterreichs Med. Wochenschrift, Sept. 14, 1844.